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the same manner and relative proportion as the mandibles and maxillæ. Here, as in other memoirs, Meinert lacks breadth and comprehensiveness in his treatment of arthropod morphology. We also think that there is a decided lack of homology between the mouth-parts of myriopods and hexapods, as we have endeavored recently to show, the terms labium, maxillæ and mandibles not being properly applicable to the myriopods, however alike their appendages are in the embryo to those of Hexapoda.

LEYDIG'S RESEARCHES IN ANATOMY AND HISTOLOGY.—Professor Leydig devotes the greater part of his most recent work, "Untersuchungen zur Anatomie und Histologie der Thiere" (Bonn, 1883, pp. 174), to the discussion of the intimate structure of the tissue cells of the Insecta. A few pages treat of the tactile papillæ of the Kentucky blind fish (*Amblyopsis spelæus*), and of the olfactory cones in the cray-fish from the Mammoth cave (*Orconectes pellucidus*). As these forms have been described in detail in earlier volumes of this journal (Jan., '72, Dec., '71), some of the readers of the NATURALIST may be interested in the result of the distinguished histologist's observations.

The tactile papillæ are arranged on the top of the head on ridges, which thus acquire a pectinated appearance (see this Jour., 1871, Pl., Figs. 7, 8, 9, 10). Professor Wyman described a filament projecting out of the funnel-shaped extremity of each papilla, but Leydig denies the existence of the filament, considers that the funnel is occupied in the fresh state by a beaker-shaped sense-organ similar to those met with everywhere in the skin of Teleostei, and suggests that as the thin edge of the funnel is occasionally prolonged into several points, one of these was mistaken for a central filament by Wyman.

In addition to the larger papillæ, isolated smaller ones are scattered over the head and mucous membrane of the mouth, being most frequent on the lips. They are not visible to the naked eye, and in fact generally require the microscope for their demonstration. They are slender and cylindrical, with a slightly broader base and fringed extremity, also hollowed out for the lodgment of a "sense-beaker."

As the want of sight in the blind fish is compensated for by the development of the tactile ridges, so in various Crustacea of the "cave-fauna" it has been noticed that the olfactory cones are present to a much greater number than in allied forms possessed of sight. Professor Leydig was unable to compare *Orconectes pellucidus* in this respect with any of the other North American species, but finds that the external branch of the antennula which bears the olfactory cones has thirty-six segments. The cones are chiefly confined to the middle third of the flagellum, and are there arranged to the number of seven on each segment, three being on the middle and four in a bunch on

the distal end. The number to each segment decreases both towards the proximal and distal ends of the cone-bearing region.

On examination of the only species of which I have living specimens just now, *C. propinquus*, I find the external branch of the antennula composed of eighteen or nineteen segments. The distal nine of these alone bear olfactory cones, and only five of them (the 11th, 12th, 13th, 14th, 15th), have the full number of eight on each joint, so that *O. pellucidus* would appear to form no exception to the rule which has been noted above as to the European "Cave" Crustacea.—R. R. W.

STERNBERG'S PHOTOMICROGRAPHS AND HOW TO MAKE THEM.¹—Many a naturalist who may be unskilled in drawing, or who may desire to reproduce by photography histological preparations, will be thankful for this excellent work, which so describes the technique of photomicrography as to enable one familiar with the use of the microscope to make photomicrographs with the least expenditure of time and money. The author, who is well known for his researches on disease-germs, has designed the work for beginners, who, like the author, had resorted to photography for the purpose of making pictorial memoranda of his microscopical observations.

The first part of the book is devoted to technology, and considers light, microscopical apparatus, the camera and photographic material, the arrangement of microscope and camera for photography, the operating room and fixtures, etc., the exposure and development of the plate, the fixing, intensification and preservation of the negative, as well as photographing by reflected light, and making positives upon glass. This part concludes with chapters upon the selection and preparation of objects for photographing.

The second part is devoted to a description of plates, and to a popular account of elementary histology, containing accounts of the Amœba, of Micrococci, of one-celled algæ, of epithelial and other cells, blood-discs and of vegetable cells and diatoms, the microphotographs being excellent. The book is a timely and useful one, and though the plates are very useful as examples of excellent work, we are not sure that it would not have given more unity to the book to have issued the second part as a separate work. At any rate there will doubtless be a good demand for such a hand-book as the present one. It is well printed and illustrated.

MISS BUCKLEY'S LIFE AND HER CHILDREN.²—The title of this

¹*Photomicrographs and how to make them.* Illustrated by forty-seven Photographs of Microscopic objects, reproduced by the Heliotype process. By GEORGE M. STERNBERG, M.D., U.S.A., etc. Boston, J. R. Osgood & Co., 1883. 8vo, pp. 204.

²*Life and Her Children.* Glimpses of Animal Life from the Amœba to the Insects. By ARABELLA B. BUCKLEY. 100 cuts. New York, D. Appleton & Co., 1883. 12mo, pp. 312, \$1.50.